



Job Loss Analysis

Control No: 2000162_____ Status: _____ Original Date: _____

Last Date Closed: _____

Organization: Global Manufacturing

JLA Type: Global Mfg Shared

Work Type: Technical Process Engineering

Work Activity: JLA Pump Survey

Personal Protective Equipment (PPE)

<input type="checkbox"/> Goggles	<input checked="" type="checkbox"/> Hearing Protection	<input type="checkbox"/> Warning Device	<input type="checkbox"/> Gloves(Nitrile, rubber, leather)
<input type="checkbox"/> Face Shields	<input checked="" type="checkbox"/> Hard Hat	<input type="checkbox"/> Tagout/Lockout kit	<input type="checkbox"/> Other _____
<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Safety Shoes	<input type="checkbox"/> Hi Viz Jacket	<input type="checkbox"/> Other _____
<input type="checkbox"/> Safety Back Belt	<input type="checkbox"/> Safety Cones	<input type="checkbox"/> Welding Hood	<input type="checkbox"/> Other _____

Reviewers

Reviewer Name	Position	Date Approved
Michelle Johansen	Process Engineering Manager/Global PED JLA Team Leader	12/14/2010

Development Team

Development Team Member Name	Primary Contact	Position
Andy Waterman	CTN 646-2461	Lead Process Engineer
Joe Ninnemann	CTN 649-2322	Lead Process Engineer
Andrew Robinson/Kempen Cloete/Belinda Eastes-Venter		Original JLA from Capetown

Job Steps

No.	Job Steps	Potential Hazard	Critical Actions
1	PRE WORK Review and Assess the pump system.	<p>1. Other work maybe happening in the same area, making it difficult to conduct a field survey at proposed time.</p> <p>2. May procure equipment unnecessarily (gauges etc) or may not procure enough equipment for the survey.</p>	<p>1. Visit the pump system in the field and identify instruments and gauges that are available to retrieve the required data.</p> <p>2. Develop a list of equipment/materials that are needed to complete a thorough survey (pressure gauges, tachometer, temperature gun etc)</p>
2	Obtain the required equipment, documentation & Information	<p>1. Inaccurate calculations/interpretation of field data and incorrect diagnosis of pump issues.</p> <p>2. Equipment purchased is not suitable for the survey (e.g. incorrect pressure range on gauge)</p> <p>3. Lack of planning could lead to pump survey being completed without all the information gathered (e.g. Pressure readings only taken at one flowrate).</p>	<p>1a. Obtain up-to-date version of pump curve and datasheet (including motor/driver data)</p> <p>1b. Confirm with rotating equip. group that impeller diameter on pump curve/datasheet is what's actually installed.</p> <p>1c. Obtain engineering data (physical properties of the process fluid, process conditions, P&ID's, lab data, unit heat/mass balance, Indx trends etc), to permit sound engineering calculations and to understand the ranges required for field instruments.</p> <p>2. Order/procure any equipment/instruments/gauges identified from field survey (step.1)</p> <p>3. Develop a pump survey plan/checklist that highlights the required operational moves (regulating discharge block valves/adjusting flowrates) and data checks required, to enable an efficient survey to be conducted. Consider introducing shut-in conditions.</p>
3	Equipment & area checks	<p>1. Tools (e.g. gauges) may not be calibrated and give inaccurate readings</p> <p>2. Other work maybe going on in the area which impacts access to tappings and reading results (e.g. scaffolding erected, column scans near pump)</p>	<p>1a. Instruments to check and confirm calibration of gauges.</p> <p>1b. Instruments to zero check instruments used for survey (flow meters etc)</p> <p>2. Check with all disciplines (e.g. ops/maintenance) that no planned work has been scheduled near pump/tappings which may inhibit access.</p>

No.	Job Steps	Potential Hazard	Critical Actions
		3.Pressure tappings could be blocked and give false reading	3.Arrange checks of proposed tapping points with operations. Operations to clear/ream tappings as necessary.
4	Resource planning	<p>1.Lack of support in the field can extend the survey, lead to rushing the task, retrieving inaccurate data.</p> <p>2.Persons conducting the survey may not be sub-station trained and insufficient amp readings etc collected.</p>	<p>1.Arrange assistance from operations for the duration of the field survey.</p> <p>2.Check that at least one of the persons participating in the pump survey, have access to the sub-station and know where to take the readings.</p>
4	COMPLETE SURVEY/ FIELDWORK Obtain permit and/or required approvals and review conditions before starting pump survey.	1.Person(s) may not fully understand the conditions set out in the permit and put themselves and others at risk or proper approvals may not be obtained.	1.Read the permit and ensure that all people participating in the survey understand the conditions and sign off in acknowledgement or review the plan with affected personnel.
5	Perform start of job LPSA	<p>1a.Person may not be wearing the full PPE set out in permit.</p> <p>1b.H2S monitor may not be worn or may not be detecting properly</p> <p>2.Conditions on site (particularly in pump area) may have changed.</p>	<p>1.Conduct a thorough LPSA before starting the job. Extend the LPSA moment to the whole party conducting the survey.</p> <p>2.Consider running through the pump survey with everyone to ensure all parties are on board with what needs to be done, when & where.</p>
6	Take the readings	<p>1.Not taking all the readings can result in insufficient information to complete effective pump survey.</p> <p>2.If survey is done on a turbine driven pump, not taking the shaft speed</p>	<p>1.Utilise the pump survey (developed in step.2) to ensure all readings are taken.</p> <p>2.Use Tachometer to measure turbine speed. If possible request for turbine to be set-up on speed for which pump curve is based on.</p>
7	Return equipment/ work area to original status	<p>1.Work area is left with tools & equipment lying around untidy and could present tripping hazards to others.</p> <p>2.Sub-Station is left with door open allowing others to access, presenting a risk to themselves and others.</p> <p>3.Tools/equipment that have come into contact with process fluid are not cleaned and could present a health hazard.</p>	<p>1a.Check that work area has been put back to a clean & tidy status.</p> <p>1b.Check that plugs and caps etc have been re-fitted.</p> <p>2.Close sub-station door and ensure operations lock accordingly.</p> <p>3.Clean gauges and equipment before returning to the rightful owner/ location. Use appropriate cleaning agents from the mechanical workshops or laboratory.</p>

No.	Job Steps	Potential Hazard	Critical Actions
8	Data Correction/Interpretation	<p>1.Readings not corrected for temp/pressure and incorrect calculations, resulting in mis-diagnoses of pump issues.</p> <p>2.Readings not corrected for pump turbine speed, resulting in incorrect calculations and mis-diagnoses of pump issues.</p> <p>3.Incorrect interpretation of pump curve data and mis-diagnoses of pump issues.</p>	<p>1.Adjust the measured flow to the appropriate conditions (correct temperature/pressure compensation)</p> <p>2a.Check/correct all pressure readings to a reference point (e.g. to pump centre line)</p> <p>2b.Apply affinity laws to correct for pump/turbine speed (as required).</p> <p>3a.Plot corrected data on pump curve</p> <p>3b.Reference pump troubleshooting guide to diagnose pump issues or discuss with pump experts.</p>